Alaska
Aquatic Pest Control
Supplemental Information

Category Six

In general, applicators who apply pesticides to property other than their own, or act as a pesticide consultant must obtain certification from the Alaska Department of Environmental Conservation (ADEC) Pesticide Program. Applicators who apply restricted-use pesticides must also be certified.

All individuals who apply pesticides to waters of the state, including marine water, surface water, or wetlands must be certified by the Alaska Department of Environmental Conservation (ADEC) in the Aquatic Pest Control category (Category Six).

The Michigan State University *Aquatic Pest Management Manual* contains the majority of information needed to successfully complete the written examination to obtain certification in Category Six in Alaska. However, regulations and requirements are different in Alaska, as are some aquatic conditions and some types of pests. This supplemental manual provides additional information that is specific to Alaska.

You will also need to have a working knowledge of the information covered in the following documents and manuals:

- National Pesticide Applicator Certification Core Manual; and
- State of Alaska Pesticide Regulations in Title 18, Chapter 90 of the Alaska Administrative Code (18 AAC 90)

CALCULATIONS

Precise and accurate application is especially important for any aquatic application. Strong math skills, including the ability to calculate stream flow, pond volumes, concentrations, application rates, etc. will be necessary to successfully pass examination for this category.

PUBLIC NOTIFICATION AND POSTING

A public place is defined as plazas, parks, public sports fields, government offices or grounds (except those with restricted access), and common areas of apartment buildings or multi-family dwellings.

Before applying pesticides to any public place, applicators must first post written notice informing the public when pesticides will be applied, and how long they must remain out of the area.

Signs must meet the following requirements:

- posted at each access point,
- posted prior to application of pesticide,
- remain in place at least 24 hours, or the re-entry period specified on the label, whichever is longer,
- at least 8 ½ by 11 inches in size,
- located between three feet and four feet above the ground, except if posted outdoors on a stake, at least 12 inches off the ground,
- include information about the date and time of application, contact name and phone number, and how long public must remain out of the area.

Record of the application, including all information required on the sign, must be maintained for at least two years after application.

Public notification requirements do not apply to the use of anti-microbial pesticides, rodenticides in tamper resistant bait stations, or ready to use pastes, foams, or gels.

Regulations related to public notification and posting requirements may be found at Title 18, Chapter 90, Section 630 of the Alaska Administrative Code. Please review the specific details of these requirements in the Pesticide Regulations.

ALASKA RECORD KEEPING REQUIREMENTS

State regulations require certified applicators to keep detailed records of ALL commercial or contract pesticide applications. Records must be kept for a minimum of two years and must contain the following information for both restricted use pesticides (RUPs) and general use pesticides (GUPs):

- Name of applicator
- Date of application
- Pesticide product name
- EPA registration number
- Location/address of area treated
- Site (e.g. front yard, living room, etc.) or specific crop to which pesticide was applied
- Target pests
- Amount applied - rate, dilution, and total amount. *(Pounds released for fumigants)*
- *Fumigants only* - temperature and duration of exposure period

The following additional information must be recorded for all RUP applications:

- Name and address of customer where pesticide was applied
- Time of application
- Percentage of active ingredient
- Disposal information for excess container, pesticide, rinsate, including disposal method, date, location.

ALASKA PESTICIDE USE PERMIT REQUIREMENTS

By state law, an ADEC Pesticide Use Permit is required before you may apply pesticide under the following circumstances:

- To any state owned or leased right of way, regardless of the size of application area or the pesticide to be applied.
- To any state owned or leased land that is 1 acre or more in area.
- **To any water body or wetlands, including creeks, drainages, streams, ponds, rivers and swamps, regardless of who owns the surrounding lands.**

- To more than one property.
- Aerial application (by airplane or helicopter).

Regulations related to permit requirements may be found at 18 AAC 90, Sections 500-540. The permitting process is rigorous, and takes a minimum of 100 days to complete. Applicators should plan well in advance to ensure that a valid Pesticide Use Permit can be obtained for the planned pesticide application.

It is against the law to apply pesticides to water without a Pesticide Use Permit.

The permitting process requires detailed information about the specifics of the proposed pesticide use. Once all the required information is submitted, the application is opened to a public comment and review period, and may require a public hearing. Once the public review period is complete, ADEC will conduct a thorough review of the proposed project and determine whether or not to issue a Pesticide Use Permit. If a Permit is issued, it does not become valid until after a 40 day waiting period, to allow time for the public to appeal the decision.

Pesticide use often raises concern in local communities, and may become contentious. Public resistance to the proposed pesticide use may impact your ability to obtain a Pesticide Use Permit.

Failure to obtain a permit is a violation of state law, and can result in significant penalties under Alaska Statute 46.03.760. It is the responsibility of the pesticide applicator to ensure that all required permits and approvals are in place before applying pesticides.

FEDERAL NPDES PERMIT REQUIREMENTS

After April 9, 2011, a National Pollution Discharge Elimination System (NPDES) Permit from EPA will also be required before a pesticide may be applied to surface water. EPA has developed a general use NPDES permit for application of pesticides to surface waters. The NPDES permit must be obtained prior to applying for an ADEC Pesticide Use Permit. For more information, contact Dirk Helder with EPA Region 10 at helder.dirk@**epa**.gov, or (208) 378-5749.

PESTICIDE LABELING

As with all pesticides, state and federal law requires compliance with all label instructions. It is particularly important to ensure that any pesticides applied to water bodies are **specifically labeled for aquatic use**.

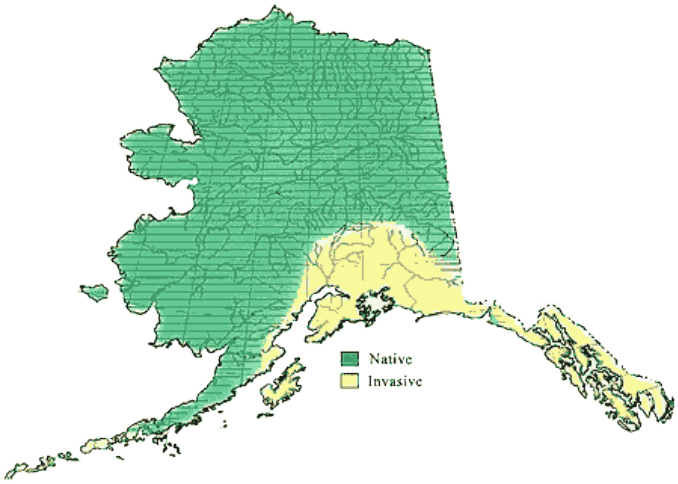
COMMON AQUATIC PESTS IN ALASKA

Invasive **Northern Pike** are the most common aquatic animal for which pesticides are used in Alaska. Aquatic vegetation control is most commonly requested for **Algae**, **Milfoil, Purple Loosestrife,** and **Yellow Pond-Lily**. Control of mosquitoes is addressed under a separate certification.

Invasive Northern Pike

The northern pike is native to most of northern and western Alaska. However, in Southcentral Alaska, the northern pike is an invasive species that does not occur naturally. Pike are top-level

predators in aquatic food chains, and will consume fish, waterfowl, and other native animals. In Southcentral Alaska, northern pike do not have any natural predators, and are capable of decimating native populations of trout, salmon and other fish.



Areas where northern pike do not naturally occur are shaded in yellow.
(From the Alaska Department of Fish and Game website)

Control of Northern Pike with Rotenone

Rotenone has been used by fish managers in the U.S. since the 1930s to remove unwanted or invasive fish. Rotenone is commercially available as either a wettable-powder or liquid and is registered by the Environmental Protection Agency (EPA) as a restricted-use pesticide for fish management.

In aquatic applications rotenone is absorbed through the gills, and inhibits the ability of fish to utilize the oxygen in their blood during cellular respiration. Because of the low concentration used for fish management, rotenone use poses little threat to birds, mammals (including humans), and other non-gill breathing organisms. Under warm temperatures, rotenone is quickly degraded. However, it is known to persist longer in cold Alaskan waters. It can also be neutralized with potassium permanganate. Rotenone has low mobility in soil, and therefore is unlikely to impact groundwater.

Alternatives to Rotenone

Alternative methods to remove invasive fish are generally not as effective or efficient as rotenone.

Fishing Regulations: Increasing bag limits and easing equipment requirements has not been effective in eradicating northern pike. Smaller pike are often released by fishermen, allowing for continued populations.

Predator Stocking: Introduction of non-native fish to prey on northern pike could have serious consequences and disrupt the ecological balance. There are no biological controls recommended for use in Alaska.

Sterilized Pike: Releasing sterilized fish to outcompete fertile spawners would take years to implement and is not likely to be effective.

Netting: Nets can be used only in shallow, non-vegetated water bodies, which is not the habitat that northern pike prefer. Nets generally don't catch all the fish, and most of the smaller fish generally escape. Repeated netting is necessary to completely eradicate a population, and these programs are labor intensive and costly. Nets also catch non-target species of fish and other types of wildlife. Netting can reduce populations of invasive fish, but this method can never eliminate them completely.

Electrofishing: Electrofishing equipment delivers an electrical current into the water, which stuns nearby fish. Because pike prefer areas with dense aquatic plants, electrofishing has limited success for pike removal. Electrofishing loses its effectiveness in water deeper than six feet. Electrofishing is unlikely to effectively eradicate all target fish.

Water Level Drawdown: Draining all the water out of a lake can effectively eradicate all target fish. However, draining even a small water body is extremely difficult, and is not possible for rivers or streams. This method also kills all aquatic life, not just the target species.

Percussion: Explosives have been used in the past to eradicate unwanted fish. Explosives are expensive, dangerous, and kill all nearby aquatic life, not just the target species. The explosion must occur very close to the fish to be effective, so it is unlikely to effectively eradicate all target fish.

Algae & Milfoil

Algae and milfoil control is covered in the Michigan manual. Review this material carefully to ensure you are familiar with the development, life cycles, biology, symptoms, typical damage caused, and appropriate control methods for these pests.

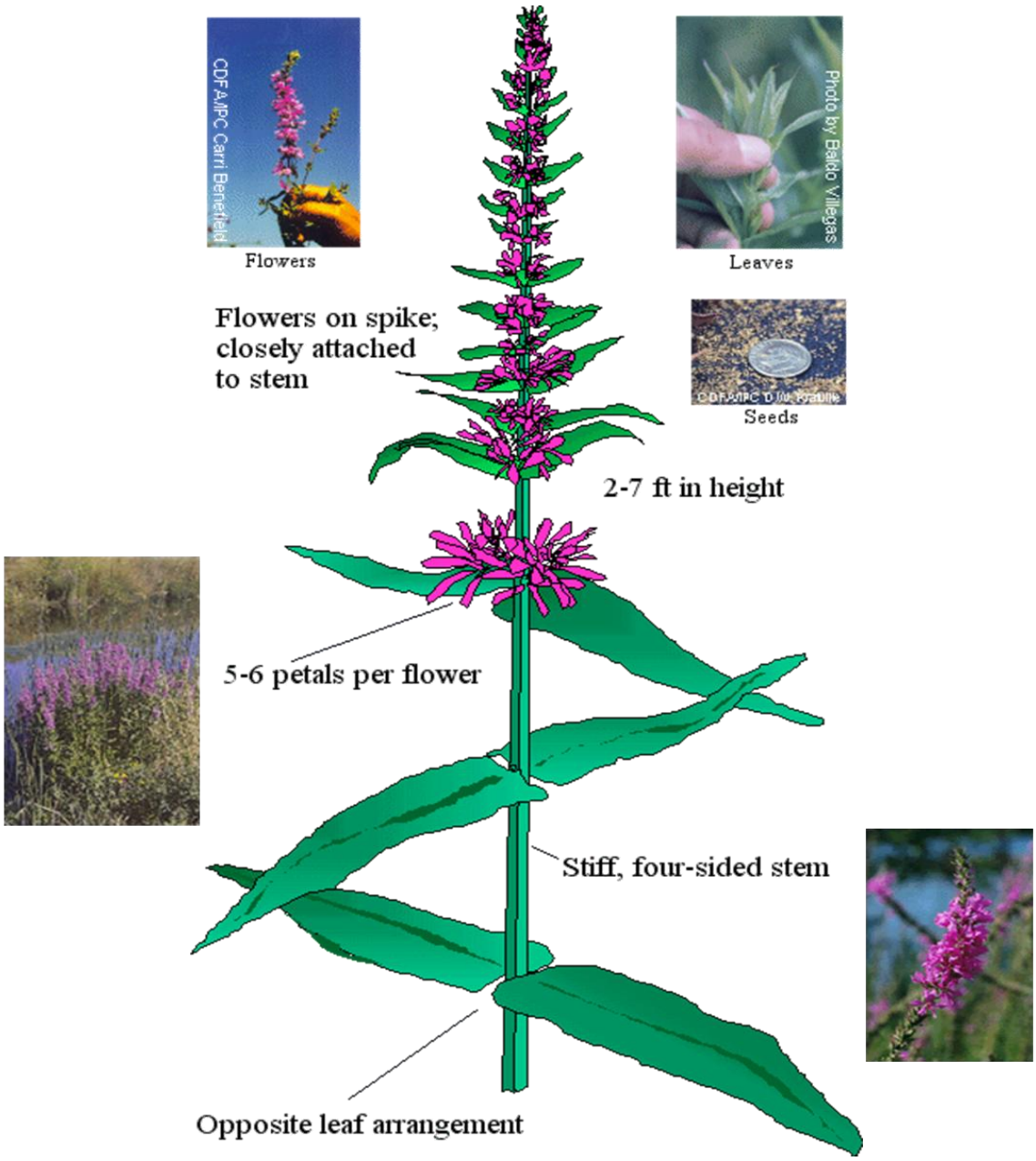
Purple Loosestrife

Purple Loosestrife (*Lythrum salicaria)* is an invasive species that is now found in waterways and wetlands across North America. Loosestrife is capable of invading most types of wetlands, including wet freshwater meadows, tidal and non-tidal marshes, river and stream banks, pond edges, reservoirs, and ditches.

Loosestrife is able to rapidly spread and become established across large areas, and can out-compete and replace native grasses, sedges, and other flowering plants. It forms a dense stand that reduces local biodiversity, provides little value to wildlife, and decreases water flow and quality.

Identification

- **Growth**: Upright, semi-woody perennial with four-sided stalk. Mature plants have dense bushy growth with one to fifty stems. Stems grow from two to eight feet tall, and die back each year.
- **Blooming period**: Mid-June into September
- **Habitat**: Moist soil to shallow water sites, such as lakeshores, stream banks, marshes, canals, and ditches. Established plants can tolerate dry conditions for portions of the year.
- **Flowers**: Pink to reddish-purple flowers with 5-6 petals and yellow centers. Numerous flowers on showy, long spikes.
- **Leaves**: Usually arranged opposite each other in pairs that alternate down the stalk, but may appear in groups of three. Leaves are linear shaped, smooth edged, and attached directly (without stalks) to four-sided stems. Tiny hairs usually present on leaves and stems. Leaves turn red for brief period in the fall, fade, and gradually fall off.
- **Seeds**: Each mature plant can produce almost three million seeds annually. Seeds are small, about the size of ground pepper. Seeds are easily spread by water, wind, wildlife, and people. Each seed can lay dormant for years in the soil before germinating.
- **Perennial rootstock**: Roots of mature plants are extensive, creating a dense web above and below ground that chokes out other plant life.
- **Do not confuse with Fireweed**: Fireweed has a conical flower spike 10-13 cm (4-5 inches) wide at the base. The fireweed stem is round, and leaves alternate up the stalk.



Control Methods

Purple loosestrife can easily spread if improper control methods are used. The best time to control purple loosestrife is in July and early August, when it is in flower. At this time plants are easily recognized, and have not yet gone to seed. When flower petals start to drop from the bottom of the spike, the plant begins to produce seed. Once seeds are produced, control activities are much more likely to disperse seeds.

Proper disposal of plant material is important to prevent re-rooting. Put all plant pieces in plastic bags to promote rotting of the vegetation, and dispose of the bags at a landfill. Composting is not advised, as purple loosestrife seeds may not be destroyed and the thick, woody stem and roots take a long time to decompose. Incineration or burning is also an effective way to dispose of plant material.

Be aware that your clothes and equipment may transport the small seeds to new areas. Thoroughly brush off your clothes and equipment before leaving the site.

Hand Pulling or Digging

Small patches of young plants can be removed by hand with little effort. The entire root mass must be removed, making sure that ALL pieces have been collected. Purple loosestrife can re-root from very small fragments. Dormant seeds may germinate because of soil disturbance during removal activity. For these reasons, it is important to monitor the site for several years.

Mechanical and Cultural Controls

Many mechanical and cultural methods have been tried, including cutting, mowing, fire, flower removal, and water table management. These methods have proven ineffective in controlling established stands of purple loosestrife. In many cases mechanical methods and controlled burns have resulted in further spread of the plant, either by disturbing the soil, which helps promote growth of loosestrife, by distributing plant pieces which are able to re-root, or by dispersing seeds.

Biological Control

The use of specially selected insects that feed on purple loosestrife is being studied to determine effectiveness. There are no biological controls currently recommended for Alaska.

Chemical Control

Herbicides are effective at controlling loosestrife. Glyphosate is often used to control purple loosestrife. Many formulations of glyphosate are sold, **but only those labeled for aquatic use may be applied in or near water**. Best results have been obtained when glyphosate is applied at bloom or shortly thereafter. Since glyphosate does not provide residual control, treated areas will need to be monitored for regrowth from the roots or seedlings for several years.

Spot application to each plant is preferable. Eliminating the entire vegetative cover will promote purple loosestrife seed germination, which can result in an increase in plant density rather than control. Work through the colony starting at one side and backing away from the area you have sprayed to avoid walking through the wet herbicide.

A variety of sprayers, including backpack sprayers and boat-mounted sprayers, can be used to control purple loosestrife in aquatic sites. Wick application is also effective but is labor intensive. Spray dye added to the tank may be useful to ensure uniform application to purple loosestrife with minimal herbicide applied to desirable plants.

Yellow Pond-Lily

Yellow pond-lily (*Nuphar lutea)*, also known as spatterdock, occurs in shallow lakes and ponds across Alaska. This naturally occurring plant provides excellent habitat for fish and other aquatic life. However, extensive growths of this plant can seriously impede recreational use of a waterway, and can obstruct floatplane use.

Identification

Yellow pond-lily is a rooted aquatic plant with large, heart shaped leaves 8 to 10 inches long and 5 to 8 inches wide supported by a long, fleshy stem. The leaves may be floating or may grow above the surface. Throughout the summer months, yellow pond-lily produces single yellow flowers on stalks, one to two inches in diameter. The petals are clustered and do not open widely, giving the flower a ball-like appearance. Flowers and leaf stems die back to the rhizome in autumn.

Control Methods

Yellow pond-lily is very difficult to eradicate because any section of rhizome left behind can re-root.

Hand Pulling or Digging

Hand-pulling is labor intensive and generally not effective over larger areas. The entire root mass must be removed, making sure that all pieces have been collected. Yellow pond-lily can re-sprout from very small fragments of rhizome.

Mechanical and Cultural Controls

Regular cutting or removal of emerging leaves every other day will eventually kill the plants, but may take several growing seasons. Benthic barriers (described in the Michigan manual) can be effective in small areas.

Biological Control

The use of infertile fish species that feed on yellow pond-lily has been used elsewhere in the United States. However, these species do not survive in Alaska. In addition, introduction of non-native fish to prey could have serious consequences and disrupt the ecological balance. There are no biological controls recommended for use in Alaska.

Chemical Control

Herbicides are effective at killing yellow pond-lily. Glyphosate applied to emergent leaves is often used to control yellow pond-lily. Granular forms of 2,4-D or other herbicides are also used to apply herbicide at the root or rhizome zone to control this plant. Many formulations of these pesticides are sold, **but only those labeled for aquatic use may be applied in or near water**.

Reed Canary Grass

Reed canary grass is an invasive plant in Alaska. It can out-compete most native plants, and replaces native grasses, sedges, and other flowering plants. It forms a dense stand that reduces local biodiversity, provides little value to wildlife, and decreases water flow and quality.

Identification

Reed canary grass is a large, coarse grass that can reach two to nine feet in height. It looks similar to other grasses, with an erect stem and gradually tapering leaf blades. Reed canary grass forms a thick rhizome mat just under the soil surface. It may grow along roadsides, stream banks, or in open fields. Flower heads turn from green or purplish to pale beige.

Reed canary grass can be differentiated from local grasses in the following ways:

- leaves are usually broader
- leaves are more erect and droop or arch less
- plants are taller
- leaves remain green in fall
- the ligule (membrane where blade and sheath meet) is transparent

Control Methods:

Reed canary grass is difficult to eradicate; multiple control methods may be necessary to effectively control this grass. Any control activities should be followed by planting native species adapted to the site to prevent re-colonization.

Hand Pulling or Digging

Hand-pulling is labor intensive and generally not effective over larger areas. The entire root mass must be removed, making sure that all pieces have been collected. Reed canary grass can re-sprout from very small fragments of rhizome.

Mechanical and Cultural Controls

The following methods may help to control reed canary grass:

- Prescribed burns in late spring or late fall – must be repeated annually for several years, and not effective in dense stands,
- Mowing in mid-June and October to reduce seed production and encourage competition from native species,
- Frequent cultivation followed by fall seeding with native grasses,
- Cover with black plastic for a growing season (effective only on small areas).

Chemical Control

Herbicides are effective at controlling reed canary grass. Glyphosate is often used to control this pest, but care must be taken to avoid impacting desired vegetation. Spot application can be made to cut stems of small outbreaks. Early spring application, when most native plant species are dormant, can be an effective way to control reed canary grass. Another method is to use a wick application, which affects taller stands of reed canary grass without impacting the shorter vegetation.

PORTIONS OF THE MICHIGAN MANUAL TO DISREGARD

Michigan states rules, requirements, and regulations cited in the Michigan manual do not apply in Alaska, and should be disregarded. Use of pesticides in Alaska is regulated under 18 AAC 90.

You may also disregard the following sections or pages of the Michigan manual, as they do not apply in Alaska:

- **Chapter 1 Laws and Regulations**; Pages 6-13. This information applies only to Michigan.
- **Biological controls**; Page 52. These techniques are not appropriate for pests found in Alaska.
- **Stunted fish**; Pages 87-89. This problem is not an issue in Alaska.
- **Lampreys**; Pages 96-97. This pest does not occur in Alaska.
- **Insect Pests Associated with Aquatic Areas**; Pages 106 - 107. In Alaska. mosquito and black fly control requires certification under Category Ten.
- **Snakes**; Page 111. This pest does not occur in Alaska.
- **Chapter 13 Public Relations**; Pages 113 – 118. While this information may be useful to applicators, it is not required for certification.
- **Appendix B Aquatic Nuisance Control Permit Forms**; Pages 135- 140. Michigan forms do not apply in Alaska.
- **Appendix C Mosquito Control Forms**; Pages 141- 147. Michigan forms do not apply in Alaska.

Before Using Any Pesticide

STOP

All pesticides can be harmful to health and environment if misused.

Read the label carefully. Use only as directed.